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Welcome to the Fall and Winter Issue of Rose-Hulman Institute of Technology's Engineers Without Borders Newsletter! We've had an excellent start to the new school year — the highlight being a trip to the Engineers Without Borders and American Society of Civil Engineers Global Engineering Conference in Panama City, Panama in early October.

What is Engineers Without Borders?

Engineers Without Borders (EWB) is an international organization with both student and professional chapters whose members design and implement sustainable solutions to health and infrastructure problems in third-world countries and the United States. We envision a world in which the communities we serve have the capacity and knowledge to meet their basic human needs. We make this happen by collaborating with both local partners and in-country Non-Government Organizations.



Recent and Upcoming Activities

Panama City, Panama

Four EWB members and one faculty advisor traveled to the ASCE-EWB Global Engineering Conference in Panama City, Panama during fall break in early October. The conference celebrated the 100th anniversary of the Panama Canal. The conference was a great international experience for the members to learn the Panama Canal and about other EWB projects around the world. The traveling members were also able to take an exclusive tour of the construction of the new set of locks at the Pacific Ocean entrance.



On-Campus

The club is excited to begin work on an on-campus project designing an ADA accessible ramp for one of the pedestrian bridges crossing Lost Creek. Design will begin in early December and continue into the spring.

The EWB-RHIT Team

President Jung Fang

Senior Chemical Engineering Major
from Jinan, China

Fundraising Manager Allison Phillips

Sophomore Civil Engineering Major
from Mooresville, Indiana

Engineering Manager Sanders Park

Junior Civil Engineering Major
from Alpharetta, Georgia

Marketing Manager Amanda Sparks

Junior Civil Engineering Major
from Kennebunk, Maine

Treasurer Ross Hunter

Junior Applied Biology Major
from Martinsville, Indiana

Secretary Hannah Conover

Sophomore Biomedical Engineering Major
from Edina, Minnesota

Dominican Republic Summary

Last spring, we travelled to the Dominican Republic to monitor the projects we completed over the past five years. The main goals of our trip were to inspect the integrity of our past projects and to talk to the community about the impact of our projects and their continued plans for project ownership. This included discussing maintenance, improvements, expansions, and replications of the projects along with the transfer of the design and construction knowledge between community members.

The first project we inspected was a roof we had constructed on an unused building to double the capacity of the Batey Relief Alliance's medical clinic in Batey Cinco Casas. We focused on monitoring its structural integrity, especially since it has already been hit by the outskirts of multiple hurricanes. Everything was holding up even better than expected – the original building hadn't settled at all due to the new roof and all of the wood and connections were still well-secured. We decided to also add a gutter system to prevent damage to the lower roof which could eventually lead to leaks. The clinic staff and patients were very satisfied with the new roof – it provided good ventilation and kept the building much lighter and cooler than the neighboring main clinic building, which is covered with a flat roof.



Our second project was a piping network and septic system for the building we had renovated so that the clinic could use it as an outpatient facility. A few months before the trip, the clinic told us that the septic system was flooding back up the system.

When we arrived, the clinic had constructed a completely new building behind the one we renovated to serve as a surgery center and redid some of the piping network. Eventually we determined that the filtration system (a re-injection well) was clogged and that some pipes needed to be rerouted. We hired a driller to clean and deepen the well, and we provided the clinic with a manual describing how the entire system functioned and how it should be maintained. The clinic was confident that they could manage the system as they expanded their services to local communities.

The final project was the set of improved pit



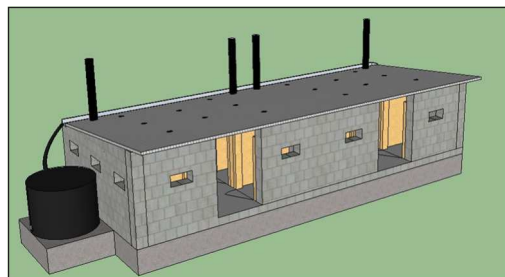
latrines we had built in Batey Santa Rosa to improve sanitation. The community, composed of mixed Haitian and Dominican ancestry, had helped construct six latrines over our time together, and the community constructed three more on their own. Again, our main goal was to verify structural integrity and confirm that the community was using them correctly. All nine of the latrines were structurally sound and the community members cleaned them frequently, used them correctly, and had added improvements. Talking with community members, we came up with a further enhanced design. The next latrines that the community will build will have a layer of concrete blocks as the first layer and the rest of the structure will sit on top, which will keep the clay and rainwater out of the latrines and better prevent the wood from rotting. The community is really excited about this prospect and are currently raising funds. They have taken great leadership with this project and have completely taken over the ownership of the latrines. We expect them to be sustained for beyond the upcoming forty years!

Ghana Latrine: Detail

During the 2013-2014 school year, Engineers Without Borders focused on designing a communal latrine for the community of Gomoa Gyaman, Ghana. The implementation of the project is yet to be executed as we were not able to travel during the summer of 2014 due to the Ebola outbreak.

Design of the latrine facility began with the club researching several different types of latrines, such as composting, biogas, and ventilated pit. The engineering team gathered data on human waste accumulation, waste degradation, and soil permeability and scaled the rates appropriately based on the population of the community.

Subsequent to formulating equations and crunching numbers, the team was able to calculate the volume of the pit needed to serve 25% of the community. Picture an average Rose-Hulman classroom and triple the volume, that was approximately the final volume needed. The storage needed for one fourth of the community's population was enormous and therefore unrealistic for the chapter's resources. The structure was then scaled down to accommodate 5% of the community with the final pit dimensions being 26 ft x 14 ft x 10 ft deep.



The

team intended to train the members of the community to dig and build the latrines properly. Ultimately, the goal was for the Gomoa Gyaman to build an additional nine latrines needed in the future. Furthermore, the residents would have to maintain the facility and would be taught how to do so. The structure was designed to hold an accumulation of one to two year's waste at a time. Therefore, the community would need to hire a professional waste removal service as needed.

The first latrine was to be built on a slight slope, allowing the rear of the latrine to be approximately two feet above grade. This also allowed pit excavation to be minimized and for easy waste removal as hatch doors were to be installed in the rear of the latrine. In order to not require shoring of the pit, which are difficult to implement, the design relied on stepped excavation. Stepped excavation takes the shape of an inverted pyramid in order to prevent cave-ins. Five male stalls and five female stalls would be built. Using rainwater collected from the roof, hand washing stations were to be placed outside of the stalls. The roof would be constructed out of timber and corrugated metal.



Per EWB-USA requirement, the latrine was designed to United States design and safety codes. The latrine also met the standards of Occupational Safety and Health Administration (OSHA), an administration that makes sure that workers have rights and are working in safe conditions. We look forward to the construction of this safe infrastructure sometime in the near future.



EWB-RHIT Mentors

Technical Mentor Wil Painter

Professional Civil Engineer
from EWB-Indianapolis

Technical Mentor Mike Cline

Professional Civil Engineer
from EWB-Indianapolis

Cultural Mentor & Translator John Gardner

Associate Spanish Professor
from Rose-Hulman

Faculty Mentor John Aidoo

Assistant Civil Engineering Professor
from Rose-Hulman

Fundraising

Fundraising is vital to our ability to continue using our Rose-Hulman education to impact developing communities worldwide. The cost of travel and construction materials is extremely high, but both are necessary for our chapter.

Through school organizations (such as the Student Government Association and the Humanities and Social Sciences Department) we are able to raise some funds for our projects.

This only covers a fraction of the total amount needed to complete our projects—especially for international air travel. We rely on private donors like you to support our projects and make a difference in third-world communities.

Donating to EWB

Contributions can be made to "Rose-Hulman Institute of Technology", directed to "Engineers Without Borders" in the memo.

For more information, contact Allison Phillips at: philliaa@rose-hulman.edu.

Contact Us

Please contact us at fangz@rose-hulman.edu if you have any questions or would like to become more involved.

More information can also be found on our website at:

www.rose-hulman.edu/ewb

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5K Fall 2014

On Saturday October 18th, EWB hosted a 5k Run/Walk to raise funds for the club's upcoming trips. It was a beautiful fall morning as the sun shone on the lake reflecting the fiery colors of the surrounding trees. Though slightly chilly, the participants and volunteers braved the fall conditions to help out the club. Nineteen runners and three walkers signed up for and ran/walked in the event. Congratulations to our winner, Andreas Maher, with a time of 17:03.00! The 5k was sponsored by Advanced Fitness Solutions, a company dedicated to providing customized fitness center plans and equipment arrangements. Several alumni and advisors came to support the club, including 2014 graduates Ryann-Rebecca Montgomery and Haaken Hagen-Atwell as well as Dr. Aidoo (Civil Engineering) and Dr. Gardner (Spanish). The 5k was a great experience for the fundraising team as they learned how to organize and carry out an event in which the Terre Haute community could participate. We plan to make this an annual event, so be sure to check our website in the upcoming spring, summer, and fall for registration information. Thanks to all the volunteers and participants for making this a great event!



Student Spotlight: Amanda Sparks

Q: Why did you decide to join Engineers without Borders?

After a volunteer trip to Guatemala in high school, with a professional civil engineer who was working to bring clean water to the community, I knew that volunteering in underdeveloped countries was something I was passionate about. I had a strong desire to help those who aren't afforded basic needs, like access to clean water, which many of us in the United States take for granted. As soon as I learned about EWB and their mission, it became obvious that it would be the first organization I joined at Rose-Hulman. I knew that I would be part of something meaningful that would change not only my perspective on the world but allow me the opportunity to use my engineering skills to help others. Looking back on it now, as a Junior and a third year member EWB, it has definitely been one of the best decisions I have made. The engineering experience and global perspective I have gained will be invaluable as I move forward in a career as a professional civil engineer.

